#
49

[CONFIDENTIAL COMMITTEE PRINT]

INVESTIGATION OF THE PREPAREDNESS PROGRAM

FOURTH REPORT

OF THE

PREPAREDNESS INVESTIGATING SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES

UNITED STATES SENATE

UNDER THE AUTHORITY OF

S. Res. 72

(84th Congress)

NAVY AIRCRAFT PROCUREMENT PROGRAM

INTERIM REPORT ON
F3H DEVELOPMENT AND PROCUREMENT

Printed for the use of the Committee on Armed Services

UNITED STATES
GOVERNMENT PRINTING OFFICE
68717 WASHINGTON : 1955

COMMITTEE ON ARMED SERVICES

RICHARD B. RUSSELL, Georgia, *Chairman*

HARRY FLOOD BYRD, Virginia
LYNDON B. JOHNSON, Texas
ESTES KEFAUVER, Tennessee
JOHN STENNIS, Mississippi
STUART SYMINGTON, Missouri
HENRY M. JACKSON, Washington
SAM J. ERVIN, Jr., North Carolina
LEVERETT SALTONSTALL, Massachusetts
STYLES BRIDGES, New Hampshire
RALPH E. FLANDERS, Vermont
MARGARET CHASE SMITH, Maine
FRANCIS CASE, South Dakota
JAMES H. DUFF, Pennsylvania
HERMAN WELKER, Idaho

THE PREPAREDNESS INVESTIGATING SUBCOMMITTEE OF THE COMMITTEE ON ARMED SERVICES

LYNDON B. JOHNSON, Texas, *Chairman*

ESTES KEFAUVER, Tennessee
JOHN STENNIS, Mississippi
STUART SYMINGTON, Missouri
STYLES BRIDGES, New Hampshire
LEVERETT SALTONSTALL, Massachusetts
RALPH E. FLANDERS, Vermont

GERALD W. SIEGEL, *Acting General Counsel*
E. RUSSEL KELLY, *Assistant Chief Counsel*
JAMES ANTON, *Special Counsel*
DANIEL F. MCGILLICUDDY, Jr., *Attorney*

LETTER OF SUBMITTAL

UNITED STATES SENATE,
PREPAREDNESS INVESTIGATING SUBCOMMITTEE,
November 4, 1955.

Hon. RICHARD B. RUSSELL,
Chairman, Committee on Armed Services,
United States Senate.

MY DEAR MR. CHAIRMAN: There is transmitted herewith an interim report of the Preparedness Investigating Subcommittee, covering a continuing investigation of the Navy's procurement of F3H Demon fighters, a long-range general-purpose jet warplane.

Although ultimate conclusions and recommendations are, of course, not possible at this time, it does appear conclusively at this stage of the proceedings that the Navy has spent in excess of $300 million in the development and procurement of the F3H fighter and the J–40 Westinghouse jet engines which were initially designed to power the plane and has yet to receive a single plane that can be certified for delivery to the fleet. Although one of the most recent models has passed its preliminary tests satisfactorily and appears capable of performing its mission, Navy reports that discrepancies still exist which will take from 6 to 8 weeks to remedy.

One particularly disturbing aspect of this naval procurement is the apparently high accident rate established in flight-testing the F3H, resulting in four fatalities and considerable property loss and damage. Accident data presently available to the subcommittee is incomplete and, accordingly, the subcommittee presents no judgment at this time.

The subcommittee's investigation is continuing. As soon as possible it will present its final conclusions and recommendations in this matter.

Numerous other inquiries and investigations are being conducted by the subcommittee, the results of which will be transmitted to you as rapidly as they are completed.

Respectfully,

LYNDON B. JOHNSON,
Chairman, Preparedness Investigating Subcommittee.

CONTENTS

	Page
Introduction	1
Summary of facts	2
The Demon fighter program	3
Summary of F3H accidents	7
Other programs affected by problems encountered in the Westinghouse J–40 engine-development program	8
Navy plans for the F3H–1 airplanes and J–40 engines	8
Conclusions	9
Exhibit A	11
Exhibit B	12

NAVY AIRCRAFT PROCUREMENT PROGRAM—F3H DEVELOPMENT AND PROCUREMENT

INTRODUCTION

The United States is engaged in a crucial race for international air supremacy. Our continued security depends very largely upon our success in attaining and maintaining this supremacy. Achievement of this goal deserves and requires constant attention and effort.

Modern planes are costly. In order to obtain air supremacy, which involves not only adequate quantities of planes but, even more importantly, the highest quality of modern planes of all essential types, a large percentage of the defense budget must be devoted to the procurement of planes for our Navy and Air Force.

Expenditures for military planes have already cost the taxpayers many billions of dollars. It is inevitable that many more will have to be spent in the years ahead if we are to achieve our objective of maintaining peace at least partially through a strong air defense. Since the American taxpayers supply the billions with which our military services procure the necessary airplanes, they are at all times entitled to assurances that for every dollar spent a dollar of value is received.

A principal responsibility of the Preparedness Investigating Subcommittee is to maintain a constant scrutiny over military expenditures to insure that the taxpayer's dollar is always effectively spent. This interim report deals with a specific Navy plane procurement in which there has been a clear and admitted substantial loss of money. Several hundred million dollars have been spent to date in connection with the design, development, and procurement of the Navy F3H general-purpose jet fighter. Although at least 79 planes have been manufactured, it was not until very recently that the Navy received a plane which could be considered capable of performing its combat mission. Tests of this plane have been completed; however, discrepancies still exist which will take from 6 to 8 weeks to remedy. No plane has been certified for delivery to the fleet.

It is the purpose of this subcommittee, through the investigation currently being conducted, to determine the causes for this large unproductive expenditure; to ascertain whether the waste was avoidable or unavoidable; and, if avoidable, to point up the errors that were made, and by whom, so that such mistakes may be prevented in the future.

The F3H, also called the "Demon" fighter, is built for the Navy by the McDonnell Aircraft Corp. of St. Louis, Mo. It was originally designed to be powered by a J–40 jet engine manufactured by Westinghouse Electric Corp. of Pittsburgh, Pa.

The subcommittee immediately launched its investigation when there were brought to its attention allegations that a substantial

number of the planes already manufactured would never be flown; that engines produced for the fighters were incapable of performing their mission; that many of the planes had been for some time stored around the St. Louis McDonnell plant without any engines installed in them; and, that in testing production models there had occurred an unusually large number of serious accidents, including four fatalities. The investigation is continuing. Only the results of our preliminary inquiry are set forth in this interim report.

SUMMARY OF FACTS

The conception of the Demon F3H jet fighter took place in 1947. As originally conceived and designed, it was to fill a requirement for a jet-powered (carrier-based) interceptor-type plane.

Westinghouse Electric Corp. had by this time successfully developed an axial flow turbojet type engine which the Bureau of Aeronautics, Department of Navy, regarded as highly desirable for an interceptor-type aircraft, even though its then thrust of 3,400 pounds was recognized as insufficient to power the planned Demon fighter.

In the following 2 years, the Bureau of Aeronautics invested large sums of development funds with which the Westinghouse Electric Corp. was to perfect a jet engine which would generate a thrust of 7,500 pounds for this interceptor plane. It was envisioned that when this capacity was achieved, it would be the only engine with this high power rating manufactured in the United States.

On January 3, 1949, McDonnell Aircraft Corp. was awarded a contract for the development of the interceptor to be known as the XF3H. The first interceptor was flown in August of 1951. Only two of these planes were built.

In March of 1951, after the onset of the Korean war altered their requirements, the Navy awarded a production contract to McDonnell to build the F3H as a general-purpose attack fighter. The design of the XF3H, interceptor, still in the experimental stage, was to be used as the basis for this production contract of the attack fighter, which was a substantially different type plane. It was to be designated the F3H–1N.

The combat mission of the new plane was substantially different. Accordingly, its weight was to be increased many thousand pounds and complete reconfiguration of the plane proved to be necessary. In the meantime, Westinghouse was to continue the development of an engine in the 9,000-pound thrust class which would be powerful enough to fly the new heavier-type fighter.

The design engineering for the new fighter was not completed until October 1952. Prior to the completion of the design engineering of the fighter, in April of 1952, the McDonnell Corp., apparently entertaining grave doubt about the ability of Westinghouse to produce an engine with sufficient power for the redesigned plane, recommended that the Navy use a J–71 engine being developed by the Allison Division of General Motors Corp. In July 1953, 14 months later, McDonnell received a Bureau of Aeronautics change request, authorizing the installation of the Allison engine in all planes on the production line beginning with the 61st fighter. The initial decision by Navy to convert to the J–71 engine was made in December 1952.

By September of 1953 development of the J–40 engine by Westinghouse had lagged to such an extent that the Navy terminated all

development contracts. Westinghouse was allowed, however, to continue the production of an interim engine until August 4, 1955, at which time 107 engines had been produced for which no proper use even now exists.

The first production model of the fighter came off the line in November 1953. In December 1953 it was flown with an interim engine which lacked the necessary power.

In the spring of 1954 further flight tests were performed on the first production model of the fighter with the interim engine installed. It was discovered that the plane had poor maneuverability at high altitudes. As a result of the test flights, a redesign of the airframe was necessary and included, among other things, a new-type wing, a change in the fuselage, and additional electronic equipment. The Navy decided to incorporate these changes in the 61st airplane, coincidental with the installation of the new J–71 engine.

In connection with these flight tests, a series of three serious accidents resulted in the plane being grounded until June 30, 1954.

Nevertheless, production of the fighter continued at the McDonnell plant.

As of September 1, 1955, the Navy had accepted 79 aircraft from McDonnell. Allison engines were installed in the last 19, and 4 of the first 60.

By permitting McDonnell to continue production of the fighter, 60 aircraft have been produced which will never be qualified as first-line combat aircraft. The majority of the airframes will never have engines installed in them.

The cost of the program to the Government for the 2 interceptors and the first 60 fighters has been in excess of $300 million.

Three McDonnell test pilots and 1 Navy test pilot have lost their lives and 7 airplanes have been completely destroyed in accidents.

THE DEMON FIGHTER PROGRAM

In aircraft technology the development of an engine always precedes the development of a new airframe. The design of new aircraft is based fundamentally on the characteristics of new engines which are scheduled or reasonably expected to be available when the new airframe is available. The most desirable procedure is to perfect the engine first and then build the airframe around it.

Unfortunately, it is not always possible to follow this optimum procedure. Urgent needs may require the taking of calculated risks on engine availability, as well as final airframe design. Risks may also have to be taken on going into immediate production of a new model without the experimentation period.

But since a perfect mating of the engine and the airframe must be achieved before an aircraft can be successfully flown, and certainly before volume production of fully combat qualified planes can be achieved, taking such risks places heavy responsibilities on those making the decisions. When such risks are taken it is essential that all responsible personnel—both in and out of Government—be constantly alert to all material changes in technical factors and other circumstances as the particular operation progresses. It is, of course, clear that a risk worth taking under one set of facts, might become foolhardy if one or more of the vital facts should materially change or be

68717—55——2

eliminated. Alertness to such changes is absolutely essential if avoidable losses of public funds expended for weapons development are to be prevented, and if unavoidable losses are to be minimized.

In a memorandum to the Chief of Naval Operations dated May 19, 1947, it was determined by the Bureau of Aeronautics that there was an urgent need for the development of a high-performance, carrier-based jet interceptor. The best engine available at that time, according to the Navy, was the J–34, which had been developed during World War II by Westinghouse. This engine had then been developed to where its power generated 3,400 pounds of thrust.

In order to meet the requirements of the contemplated interceptor, an engine of greater capacity than this would have to be developed. Accordingly, the concept of the J–40 engine came into being. Westinghouse had been working on a development program to increase the power capability of jet engines and it was believed at the time that it could develop an engine, J40–6, which would generate 7,500 pounds of thrust. Therefore, it was decided to assume the risks of failure and build the characteristics of the needed interceptor around a 7,500-pound thrust engine yet to be developed.

A contract with Westinghouse was initiated in June of 1947. In January 1949 McDonnell Aircraft Corp. was awarded a contract for the development of the interceptor, known as the XF3H, which was to weigh approximately 19,000 pounds.[1]

Because of repeated design modifications the XF3H continually increased in weight. For this and other reasons it evidently became essential to have an engine with even greater thrust than 7,500 pounds. In December 1949 Westinghouse was awarded another development contract for an engine in the 9,000-pound thrust class, the J40–10.

When the Korean war broke out in the summer of 1950, the requirement for carrier-based airplanes changed, abruptly and materially. The Navy determined its most urgent need was then for an all-weather, long-range attack fighter. It decided to base the design of such a plane on the XF3H interceptor model. In March 1951 McDonnell was awarded a production contract to build a long-range, general-purpose attack fighter, by conversion of the XF3H interceptor. The decision to go immediately into production, without constructing an experimental model, involved still another serious calculated risk.

According to the president of McDonnell Aircraft Corp., the production of this plane required an almost complete redesign of the experimental interceptor model. He reported it resulted in a 90 percent redesign of the interceptor. The redesign resulted in a larger fuselage, insertion of air-to-ground armament, increase in armorplate, and a substantial increase in the fuel load capacity, to meet the requirements of this long-range fighter. All this resulted in a substantially heavier plane, which ultimately reached a weight of 29,000 pounds.

Because the configuration of the airplane was changed and combat requirements increased, it was necessary to build this new aircraft around a more powerful engine. Westinghouse having been given a contract in December 1949 to develop an engine with a contemplated 9,000-pound-plus thrust (the J40–10), McDonnell was advised to de-

[1] The first flight of the interceptor with a Westinghouse J40–6 engine was made in August of 1951, 5 months after the Navy had decided to convert the plane from an interceptor to a long-range general-purpose attack fighter. Because the Navy changed its program as a result of the Korean conflict, only 2 experimental interceptors were built, at a cost of $15,130,819.59.

sign the plane around this engine, even though there was no certainty it could be produced on time, or ever.

On May 22, 1951, a letter of intent for the production of 150 F3H–1 airplanes was awarded to McDonnell.[2] The design engineering for this F3H–1 (Demon fighter) evidently lagged seriously since it was only substantially completed as of October 1952. Nevertheless, the first plane was scheduled to come off the production line in January of 1953. Actually, however, the first production model of the airplane came off the line in November 1953. The Westinghouse J40–10 (9,000-pound-plus thrust) engine, which had been hopefully scheduled for delivery in September of 1953, was never developed.

The Bureau of Aeronautics initially complained to Westinghouse in April 1949 about the lagging development of the J–40 engine. Again in July of 1950 the Bureau of Aeronautics by letter to Westinghouse expressed concern over the slow progress. A reexamination and acceleration of all development programs was requested.

By October of 1951, it became apparent to the Navy that Westinghouse would not be able to develop the 9,000-pound-plus thrust engine in time to meet the production schedule of the McDonnell fighter. It thereupon ordered Westinghouse to produce an interim engine (the J40–22A) with a thrust of more than 7,000 pounds. Development, however, continued on the higher powered engine until September 1953.

The Navy admittedly knew in 1951 that the interim engine would be underpowered for the proposed fighter, but asserts it went forward with the production of the interim engines in order to utilize them for the purpose of test-flying the fighters. It still believed the more powerful engine would ultimately be developed for the fighter so that it could be fitted into the McDonnell production line.

By the summer of 1952 the development program on the J40–10 engine was so retarded that the officials of the Bureau of Aeronautics and Westinghouse engineers conferred and agreed to redesign the program. Goals were revised. The engine was to pass its qualification tests by September of 1953.

Again Westinghouse did not progress fast enough and the Navy canceled both programs on September 1, 1953.

The Allison J–71 engine, which had been recommended by McDonnell in April 1952, and tentatively considered by the Navy shortly thereafter, was then definitely scheduled for installation in the 61st airplane, the first 60 planes being regarded as too far along in production for the incorporation of this change. In the meantime, the Navy went forward with plans to install the Westinghouse J40–22A, the underpowered 7,000-pound-plus thrust engine, in the first 60 planes. In November 1953 this engine was in fact placed in the first F3H–1 fighter off the production line.

In June of 1953 the production contract had been increased to 528 planes even though at this time there was apparently little cause for believing that an adequately powered engine would ever be available.[3] This award was subsequently cut back in November of 1954 to 280 airplanes, with McDonnell having an initial contract for 150 planes and a follow-on contract for 130 additional planes.

[2] Due to the urgency of getting this model as soon as possible to fill important fleet requirements, production contracts were also awarded to Goodyear Aircraft Corp., of Akron, Ohio, and Temco Aircraft Corp., of Dallas, Tex. These second source contracts were subsequently canceled and no production was achieved. Termination of these contracts resulted in a loss of $10,484,000.

[3] Subsequently the J–71 Allison engine scheduled during this period for the F3H–2 model (61st plane) has proven acceptable, as borne out by tests performed by the Navy in July of 1955.

In early 1954 further experimental flight tests were held on the production model. By February 11, 1954, it became apparent that the under-powered J40–22A interim engine might prove to be unreliable and unsuited for the flight-test purposes for which it was procured. This feeling resulted from reports by McDonnell to the Navy that January flight tests had developed compressor stalls in the engine.

In March 1954, three successive relatively serious accidents occurred in flight testing and the plane was grounded. Repeated conferences were held with Westinghouse in an effort to correct deficiencies in the engine. It was also determined necessary to perform major redesign work on the airframe. Wing structure, radar changes, armorplate and electronic equipment, and a fuselage redesign brought the weight of the fighter ultimately up to 29,000 pounds.

On June 21, 1954, the Navy issued a memorandum on the Demonfighter program. It was concluded that the J–40 engine would never be a completely acceptable service engine. In addition, the poor maneuverability of the aircraft at high altitudes was noted as an unsolved problem. Accordingly, the F3H–1 model was to be limited to a one-service tour with no overhauls to be performed. Spare parts support was cut back, and the overall effect of the memorandum was the final abandonment of all hope to make the F3H–1, which represented the first 60 planes produced by McDonnell, a first-line flight-service aircraft.

Since the decision was made on July 2, 1953, to substitute the J–71 Allison engine for the never-developed J40–10 Westinghouse engine, beginning with the 61st plane off the McDonnell production line, it was now determined that the airframe modifications shown to be necessary by the March flight tests would be incorporated also with future production, commencing with the 61st plane. No attempt was to be made to retrofit the J–71 engine into more than 3 or 4 of the first 60 planes, since alterations in the airframe structure to accommodate this engine were considered to be prohibitively expensive.

The first production model F3H–1 came off the line in November 1953. It was flown with an interim engine. The weight of the plane had been increased to 29,000 pounds. The model was not able to perform its originally programed combat mission. There was some doubt that it could even fulfill its subsidiary goal of test-flying.

The estimated cost for current contracts with McDonnell (1 for 150 and 1 for 130 planes) is $510,784,000. This figure includes the costs of engines and other Government-furnished equipment.

As of March 31, 1955, the McDonnell Corp. on its first contract had received progress payments amounting to $133,183,379 and a progress payment of $8,300,376 on the second contract.

Originally the tentative target price for the F3H–1 model, not including spare parts and special tools, was estimated at $775,000 per plane. Subsequent to the conversion from the F3H–1 model to the F3H–2 model, firm target prices were established at $1,024,200 per plane.

The cost to the Government of the J–40 engine development and production program amounted to $220 million, broken down as follows:

	Millions
Development	$35
Production	48
Facilities	[1] 137

[1] For this expenditure the Government equipped a plant at Kansas City, Mo., for the production of jet engines. At the present time jet engines other than the J40 are being produced at this plant.

For the expenditure of this money, the Government received a total of 140 engines of all types, which are destined primarily for experimental purposes, and an improved engine plant, with machine tools, at Kansas City, Mo.

The vice president in charge of information service at Westinghouse's aviation gas turbine division at Kansas City has recently announced that the difficulties in the J–40 engine development program were chiefly and fundamentally engineering and the responsibility of Westinghouse. He raised the question, however, indicating he did not know the answer, of why the Navy had permitted the production of the underpowered interim J40–22 engine to continue as long as it did.[4]

As of September 1, 1955, 79 aircraft had been accepted by the Navy from McDonnell. The first 60 were the F3H–1 model, unsuitable for their intended mission. The last 19 are powered by J–71 Allison engines and known as the F3H–2 model. While the Navy has flown at least one of these planes off carrier decks, and claims it will successfully perform its mission, it seems clear that full and conclusive proof of the plane's combat-mission qualifications is yet to be forthcoming.

SUMMARY OF F3H ACCIDENTS

Because of conflicting accounts and incomplete access to the basic report data, the subcommittee does not yet have what it regards as complete and accurate information on all F3H aircraft accidents. According to present information there have been 12 major accidents during test flights, resulting in the loss or damage to the aircraft and the death of 4 pilots (1 Navy, 3 McDonnell).

Of these 12 accidents, 3 resulted from engine malfunction; 3 were the result of airframe difficulties; and 6 cannot be precisely ascribed to either airframe or engine trouble alone. The first accident occurred on August 2, 1952, when there was an engine turbine failure in the interceptor model. The plane required major overhaul.

Three accidents occurred on the 9th, 16th, and 18th of March 1954. In the March 9 accident, an XF3H interceptor, experimental

[4] The balance of Mr. Dale McFeatters' statement is also of interest. He stated:

"The order for the J40 was placed during the Korean emergency and was based on an experimental model designated the J40–6. It looked like a good engine, and the Navy scheduled the J40 for installation in the F3H.

"A model designated the J40–24, much higher powered than the J40–6, was to be developed from the original design for eventual use in the planes. However, an engine was needed for tests of the airframes as they came off the line before the J40–24 was available. An interim engine, the J40–22, was decided upon for this purpose.

"The –22 model did not have the power which was to be furnished by the –24 model, and it quickly became apparent that it was not adequate for the plane. Westinghouse continued its efforts to solve the difficulties. We weren't able to move fast enough, however, and by the time we had the answers the Allison J71 was either ready or far enough along so that it was a certainty. The J40–24 contract then was canceled and the J40–22 contract cut back. A total of 69 J40–22's were manufactured.

"We probably were overconfident in accepting the contract because of our experience in manufacturing large numbers of the J30 and J34 engines, which gave excellent service. We didn't realize the great advances that had been made in the matter of greater power and lower fuel consumption in jet engines."

model, exploded and disintegrated in midair. The pilot parachuted to safety.

On March 16, an F3H–1 fighter, production model, lost power in flight and the pilot made a dead-stick landing. The aircraft was damaged substantially but was repairable.

On March 18, an F3H fighter, production model, while undergoing the Navy preliminary evaluation flight, developed engine failure. Shortly thereafter the tail assembly separated from the aircraft and, while the Navy test pilot parachuted to safety, the plane was a total loss.

Immediately after this last accident the fighter was grounded. Flying was not resumed until June 30, 1954.

The first fatality occurred in February 23, 1955, when a McDonnell test pilot was killed in the F3H–1N fighter that was converted into an F3H–2N J–71 (Allison engine) powered prototype. The pilot was performing a supersonic speed test at high altitude. The cause of the accident has never been firmly established.

The second fatal accident occurred on April 19, 1955, when a Navy test pilot was killed in an F3H–1 fighter during deliberately flamed-out (dead-stick) landing tests. An inadequate emergency-powered control system was held responsible.

On May 18, 1955, a McDonnell test pilot was killed in an F3H–1N fighter. The engine stalled during flight at 30,000 feet. A malfunction in the ejection seat prevented the pilot from parachuting to safety.

On July 7, 1955, a McDonnell test pilot was killed in an F3H–1N fighter attempting takeoff. For an undetermined reason, the pilot did not use the J–40 afterburner and the engine did not have sufficient thrust to take the aircraft off the ground.

Detailed information concerning all accidents may be found in exhibit A.

There is substantial evidence that there have been, in addition to these 12 accidents, approximately 18 aborted flights caused by either a malfunction of the engine or a defect in the aircraft.

OTHER PROGRAMS AFFECTED BY PROBLEMS ENCOUNTERED IN THE WESTINGHOUSE J–40 ENGINE DEVELOPMENT PROGRAM

The subcommittee has ascertained that the Westinghouse J–40 engine development program apparently had deleterious effects upon planes other than the F3H Demon fighter. It has already been determined that difficulties were encountered involving the J–40 engine in the XF4D and the XA3D, both under development by Douglas Aircraft Corp., and the XF10F by Grumman Aircraft Corp. Further investigation may reveal that other plane-development programs were also affected.

Originally the F4D fighter was programed with the installation of Westinghouse J–40 engines. Due to the troubles with the J–40 engine it was necessary to change over to the J–57 engine being produced by Pratt & Whitney. Changing engines necessitated a redesign of certain parts of the aircraft and production delays. Similar production delays resulted from the necessity of substituting the J–57 in the XA3D attack bomber, also originally designed for the J–40.

The F10F fighter to be produced by Grumman was programed around the J–40 engine. The contract for this airplane has been

terminated in its entirety and no other engine was ever ordered to be installed. Parts for 10 or 12 planes had been built and 2 experimental models produced when cancellation occurred. The major parts and assemblies that had been built were ordered destroyed. The cost of this program was $22,285,000.

NAVY PLANS FOR THE F3H–1 AIRPLANES AND J–40 ENGINES

Sixty fighters were produced under the F3H–1 program. Accidents caused the destruction of eight planes. Of 14 planes complete with engines, 3 are equipped with J–71 Allison engines and 11 have the Westinghouse J–40–22A interim engines installed. There are 38 airframes which have no engines installed. With the exception of the three airplanes equipped with the Allison engine, the Navy does not contemplate using any of the F3H–1 planes for operational flying. Plans are presently being formulated to utilize the planes for some nonoperational use.

The approved plan for 15 planes to date is as follows:

(*a*) Four assigned to Memphis, Tenn., for ground instruction of maintenance personnel;

(*b*) Five assigned to Philadelphia, Pa., for barricade and catapult tests;

(*c*) Four assigned to Aberdeen Proving Grounds, Md., in gun and missile vulnerability tests;

(*d*) Two assigned to Jacksonville, Fla., for ground instruction of personnel and maintenance.

It is anticipated that the remainder of the planes will be used for similar purposes.

There were 107 Westinghouse engines produced in the J40–22 interim program. The 11 engines already installed in the F3H–1 will remain with the aircraft and the entire assembly will be designated for noncombat use. The Navy has elected to not test 20 engines which will remain nonoperable. The Bureau of Ships has been assigned 12 engines to operate a special project. The United States Air Force will receive 12 engines for use in a research and development program. A number of engines have been destroyed through accidents and during tests. The remaining engines are to be assigned to the Naval Air Command in Memphis, Tenn., for ground instructional training and for disposal as excess material. Spare parts for engines which have been delivered to McDonnell Corp. are to be disposed of by the company.

CONCLUSIONS

The foregoing account of the Navy's F3H Demon fighter procurement activities necessarily raises more questions than it answers. This is an interim report. It has been our purpose to analyze the information that has thus far been gathered, delineate by careful chronological statement the possible issues and areas for further exploration, and report to the committee, Congress and public what is presently known about circumstances of great national importance.

It is apparent that many decisions were made, at the beginning and during the course of this procurement, involving serious calculated risks. From information presently available it is impossible, even by exercising the advantage of hindsight, the unfairnesses of which we

will assiduously strive to avoid, to conclude whether the decisions were wise and the risks properly evaluated and assumed.

Moreover, it will require considerable further probing to ascertain whether the essential alertness to changes along the development path was exercised by all responsible personnel, and whether reappraisals and new decisions were made promptly and wisely.

Planning for this procurement began in 1947. The operation has been continuous to the present day, with numerous changes in technical factors and other material circumstances.

We know—

(1) That in excess of $300 million has already been spent;

(2) That the first 60 planes will never perform their intended mission;

(3) That 107 J–40–22 engines received by the Government are unsuitable for their intended mission;

(4) That at least 12 serious accidents and 18 aborted flights due to malfunctions have occurred in testing the F3H, with 4 lives lost;

(5) That the Westinghouse engine-development program had a costly impact upon the procurement of at least three other airplane models; and

(6) That the F3H–2, powered with the Allison J–71 engine, has yet to fully prove itself qualified for its combat mission.

The investigation will continue. As soon as possible this subcommittee will report its final conclusions and recommendations.

EXHIBITS

EXHIBIT A.—*F3H accident record* [1]

[Aircraft accident report record NAVAUER-2879 (new 7-52)]

Pilot	Model	Bureau No.	Date	Location	Purpose	Weather	Injuries, pilot [2]	Damage, plane [3]	Remarks
Mr. Houghton	XF3H	125444	Aug. 2, 1952	Pratt, Kans.	MAC test	O. K.	E	B	J40-We-6 engine turbine failure; landing short of runway.
Mr. North	XF3H	125444	Mar. 9, 1954	St. Louis	do	O. K.	C	A	In-flight fuel explosion; J40-We-8 engine.
Mr. C. Brown	F3H-1N	133489	Mar. 16, 1954	do	do	O. K.	E	D	Engine-turbine failure; oil line failed bearing seizure; dead stick.
Lt. W. Smith	F3H-1N	133490	Mar. 18, 1954	do	USN evaluation	O. K.	C	A	Engine turbine or fuel line failed; fire; bailout.
Not available	F3H-1N	133492	Oct. 3, 1954	do	Test	O. K.	E	C	Gear folded after arrested landing.
Mr. North	F3H-1N	133491	Nov. 1, 1954	Pax River	Taxi engagement	O. K.	D	A	Taxi engagement; arresting gear failed.
Not available	F3H-1N	133493	Jan. 10, 1955	Washington, D. C.	Ferry	O. K.	E	D	Starter unit fell off in flight.
Major Feliton	F3H-1N	133501	Jan. 20, 1955	Pax River	CV Damo	O. K.	E	D	Nose gear failed on in-flight gear engagement.
I. E. Todnam	F3H-1N [4]	133520	Feb. 23, 1955	St. Louis	Test, Hi-Mach	O. K.	A	A	Pilot doing Mach 1.12 stick raps.
Comdr. K. D. Smith	F3H-1N	133499	Apr. 19, 1955	Pax River	BIS trial	O. K.	A	A	Power-control loss in intentional dead-stick landing.
Mr. R. Strange	F3H-1N	133495	May 18, 1955	St. Louis	MAC test	O. K.	A	A	J-40 compressor stall; ejection-seat malfunction.
Mr. A. Seawell	F3H-1N	133494	July 7, 1955	do	do	O. K.	A	A	Nonafterburner takeoff was not successful.

[1] In addition to the above table, there were 2 recent accidents which resulted in the loss of the aircraft and minor injury to the pilots. The planes involved were F3H-2N models. Details have not been supplied to the subcommittee by the Navy.

[2] Explanation:
Class A, pilot injury is fatal.
Class B, critical injury.
Class C, pilot injury is serious.
Class D, pilot injury minor.
Class E, pilot is not hurt.

[3] Explanation:
Class A, damage is loss of the aircraft.
Class B, substantial major overhaul.
Class C, substantial major overhaul not required.
Class D, damage is minor damage.

[4] F3H-1 converted into F3H-2 J-71 powered prototype.

Just prior to the submission of this report to the printer, a letter to the chairman from Secretary of the Navy Charles S. Thomas was received, on October 22. This letter, which outlines the Navy position on the F3H procurement program, is set forth in full below:

EXHIBIT B

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
Washington 25, D. C., October 21, 1955.

Hon. LYNDON B. JOHNSON,
Chairman, Preparedness Investigating Subcommittee,
United States Senate, Washington 25, D. C.

MY DEAR SENATOR JOHNSON: Thank you for your letter of September 30, 1955, relative to the upcoming hearings by the Senate Preparedness Investigating Subcommittee which will consider aspects of the 1951 procurement program to obtain Westinghouse jet engines for use in the Navy's F3H fighter.

Undoubtedly, as head of the committee, you have been advised by your staff investigators that full cooperation has been extended by the Chief of the Bureau of Aeronautics in providing complete information on this particular subject. In connection with your staff's continuing objective examination of Bureau records, it should be noted that detailed information has been and is being supplied, as required; specific questions received definite answers, and copies of all documents have been made available on request.

From an exhaustive review of the procurement case in question, it is my opinion that several basic factors are involved. For example, it must be remembered that prior to Korea, military appropriations for research, development, and procurement had been cut drastically. During that time, the Navy did not have sufficient funds to develop and produce a substantial number of new, advanced-type aircraft essential to meet the competitive demands of a war.

Naturally, the advent of Korea reversed the situation. Large sums were appropriated for necessary military programs. Operating under such an abrupt change and faced with overnight logistic demands, it is my sincere belief that no one could be criticized for all-out effort to obtain, as quickly as possible, advanced-type aircraft with advanced airframe and advanced engine designs.

The F3H was the result of one such effort to meet the needs of the time. It was built around the J–40 engine which unfortunately did not develop as anticipated.

Circumstances surrounding procurement of the F3H preclude the possibility of criticism other than that which might be directed at the policy of ordering a number of planes prior to ascertaining that the proposed engine would produce the estimated thrust.

It is apparent that placing sizable definitive contracts enabled the contractor to obtain and fabricate materials, purchase various necessary equipment and make large expenditures which would require writing off, if either the airframe or engine did not develop satisfactorily.

Obviously, then, the desire to obtain an advanced plane to meet a specific need is not a subject for criticism, but the form of procurement might be.

To clear up any misunderstanding, in the event that it is thought that practices of procurement such as those involving the F3H are existent, it is a pleasure to advise you that this is not the case. Almost 2 years ago, the Navy developed and now has in effect procurement procedures designed to prevent the recurrence of a similar situation. It should be emphasized that, under new procurement procedures, a limited number of airframes and engines are to be obtained and tested prior to letting large, definitive orders.

In the event staff investigators of your committee, faced with the multitudinous task of summarizing documents and data provided them, have not had an opportunity to present a detailed analysis, it might be helpful to consider the F3H program from an overall viewpoint.

Since the engine selected originally did not meet requirements, every effort has been directed toward maximum recovery of sums expended and toward research to correct and, ultimately, replace the initial engine. Each stage in the redevelopment and modification of original specifications has been a matter of close, continuing coordination between the Navy and the McDonnell Aircraft Corp., builders of the F3H.

At the beginning, a Westinghouse J–34 engine had an excellent record, and the manufacturer promised to develop the J–40 with the thrust required by the F3H

and in time to meet the F3H production schedule. Contracts were let in 1951 and 1952 for the F3H and the J–40.

The desired J–40 engine was not delivered on schedule. This necessitated substitution of a J–40 with a 20 percent lower thrust in late 1951, the only substitute then available at a time when the Navy was faced with an immediate need for an advanced fighter.

It was recognized that the lower thrust engine would lessen the performance of the F3H–1. However, to bridge the time gap until Westinghouse could develop the high-thrust J–40, steps were taken to permit testing the airframe. It was expected that these few planes could be back fitted with high-thrust J–40's as soon as they became available. Low-thrust engines were ordered in late 1951, and deliveries began in January 1953.

In the meantime, work got underway in early 1952 on a redesign of the Allison J–71, designed to fit the F3H. Prototypes of the redesigned J–71 were ordered in December 1952. At the insistence of the Navy, meanwhile, Westinghouse continued efforts to improve the J–40 as to engine design, engineering characteristics and quality control. That was the situation when I assumed office.

The desired high-thrust J–40 did not become a reality and the Navy did not receive it for evaluation tests.

In July 1953, the J–71 prototype was advanced to the stage where the Navy advised McDonnell to modify the F3H–1 to an F3H–2 configuration on each plane not too far in production. This was determined to be the only way to obtain maximum usefulness and also to recover a maximum amount from funds expended. Deliveries of the J–71 started in October 1954.

By July 1955, after every corrective possibility had been explored, it was concluded that the J–40 could not perform satisfactorily. This necessitated termination of effort to salvage any part of the J–40 program. The F3H–1 planes were therefore restricted to nonflying applications.

It is a matter of record, despite the difficulties encountered, that of the 150 F3H aircraft ordered in 1951–52, the Navy has limited to 29 the number of airframes which cannot be equipped with the J–71 engine. It has held to 60 the number of planes with the F3H–1 configuration. The 60 planes with the F3H–1 configuration cost approximately $154 million. It is estimated that the cost of the entire F3H–1 and F3H–2 program—280 planes—will cost around $510 million, including some 220 F3H–2's, with the Allison J–71 engines. This figure covers cost of airframes, engines, electronic equipment, and reserve spare parts which normally will be required during the life of the planes.

Further, the F3H–2, with the J–71 engine, is considered a good prospective, all-weather plane, although it is still in the development stage. This aircraft has completed the significant portion of its evaluation, including carrier suitability Fleet deliveries are scheduled for January 1956. No delays are anticipated at this time.

Inasmuch as it has been impossible to give individual attention to the numerous inquiries on the subject of the F3H–1 and the F3H–2 programs, it is planned to cover the queries insofar as possible through release of the contents of this letter to news media.

Sincerely yours,

C. S. THOMAS.

○